Claims

1. A method for the determination of the object distance (D) between an opto-electronic sensor (11) working according to the principle of triangulation and a sensed object (13),
   - wherein the sensor (11) has at least one measuring channel between a transmission unit (S1; S) for the emission of electromagnetic sensing rays into the measuring region and a reception unit (E; E1) for the detection of sensing rays reflected and/or remitted from the measuring region;
   - wherein the sensor (11) has at least one additional channel which has a further transmission unit (S2) and/or a further reception unit (E2) in addition to the transmission unit (S1; S) and the reception unit (E; E1); and
   - wherein the received signals of the measuring channel and of the additional channel are jointly evaluated in order to determine the object distance (D).

2. A method in accordance with claim 1, characterized in that the measuring channel and the additional channel are operated jointly, and in particular at least substantially simultaneously, for each object distance (D).

3. A method in accordance with claim 1, characterized in that only the received signal of the measuring channel is used to determine a distance value, in that a determination is made by means of the

received signal of the additional channel whether the received signals fulfill at least one additional criterion and in that the distance value is used as the measure for the object distance (D) if the additional criterion is fulfilled.

4. A method in accordance with claim 1, characterized in that the received signals of both the measuring channel and of the additional channel are used to determine a distance value serving as the measure for the object distance (D).

5. A method in accordance with claim 1, characterized in that in the measuring channel and/or in the additional channel the respective intensity distribution of the received signal on the reception unit (E) or on the reception units (E1, E2) is used for the determination of the distance.

6. A method in accordance with claim 5, characterized in that the position of a center of the intensity distribution or of a characteristic region of the intensity distribution is used in the measuring channel and/or in the additional channel for the determination of the distance.

7. A method in accordance with claim 1, characterized in that a separate transmission unit (S1, S2), and preferably a joint reception unit (E), is respectively used for the measuring channel and the additional channel.

8. A method in accordance with claim 7, characterized in that the sensing rays of the measuring channel and of the additional channel are emitted in different directions.

9. A method in accordance with claim 8, characterized in that when mutually corresponding characteristic regions of the received signals of the measuring channel and of the additional channel are jointly evaluated, an investigation being made in each case whether they are in particular mutually displaced by an expected amount ($a \cdot \Delta X$).

10. A method in accordance with claim 7, characterized in that the sensing rays of the measuring channel and of the additional channel are focused at different distances (d1, d2), with the focus preferably being at a near range in one channel and at a far range in the other channel.

11. A method in accordance with claim 10, characterized in that when mutually corresponding regions of the received signals of the measuring channel and of the additional channel are jointly evaluated, an investigation being made in each case whether the emitted sensing rays are imaged with different sharpness, in particular with a sharpness differing in accordance with an expected amount.

12. A method in accordance with claim 1, characterized in that the sensing rays of both the measuring channel and the additional channel are focused.

13. A method in accordance with claim 7, characterized in that the sensing rays of the additional channel are deliberately emitted, in particular in an unfocused, scattered, expanded and/or diffuse manner, such that a spatially expanded sensing zone is emitted into the measuring region, with the sensing zone preferably being emitted into at least a substantial part of the half-space of the sensor (11) on the sensed object side and in particular at least substantially into the whole half-space.

14. A method in accordance with claim 13, characterized in that a difference is formed between the received signals of the measuring channel and of the additional channel on the joint evaluation hereof.

15. A method in accordance with claim 13, characterized in that, on the joint evaluation, the received signal of the additional channel is deducted from the received signal of the measuring channel, in that negative difference values are set to zero and in that a resulting positive difference signal is used for the determination of the distance.

16. A method in accordance with claim 13, characterized in that the intensity of the sensing rays are selected such that the received signal is larger in the additional channel than in the measuring channel in a characteristic region which is caused by an interfering object (15) with a high reflection and/or remittance capability in comparison with the sensed object (13).

17. A method in accordance with claim 1, characterized in that a separate reception unit (E1, E2) and/or a separate optical reception system (FE1, FE2) is respectively used for the measuring channel and the additional channel, with preferably a common transmission unit (S) being used.

18. A method in accordance with claim 17, characterized in that the transmission unit is arranged between the at least two reception units and/or optical reception systems, in that a center of the intensity distribution and the distance of the center from the position of the transmission unit are respectively determined for the received signals, and in that the mean value of the center distances are used as a measure for the object distance.

19. A method in accordance with claim 17, characterized in that the at least two reception units (E1, E2) and/or optical reception systems are arranged at the same side of the transmission unit (S) and the distance (ΔX) between mutually corresponding characteristic regions of the received signals of the measuring channel and of the additional channel are used as a measure for the object distance (D).

20. An apparatus for the determination of the object distance (D) between an opto-electronic sensor (11) working according to the principle of triangulation and a sensed object (13),

- having at least one measuring channel between a transmission unit (S1; S) for the emission of electromagnetic sensing rays

into the measuring region and a reception unit (E; E1) for the detection of sensing rays reflected and/or remitted from the measuring region;

- having at least one additional channel which has a further transmission unit (S2) and/or a further reception unit (E2) in addition to the transmission unit (S1; S) and to the reception unit (E; E1); and
- having an evaluation unit for the joint evaluation of the received signals of the measuring channel and of the additional channel in order to determine the object distance (D).

21. An apparatus in accordance claim 20, characterized in that all transmission units and reception units (S, S1, S2, E, E1, E2) are arranged in a common sensor plane (21) which preferably extends perpendicular to the distance direction corresponding to the shortest distance between the sensor (11) and the sensed object (13).

22. An apparatus in accordance with claim 20, characterized in that the or each transmission unit (S, S1, S2) is provided in the form of an LED or a laser device.

23. An apparatus in accordance with claim 20, characterized in that the or each reception unit (E, E1, E2) is provided in the form of a spatially resolving detector, in particular of a single row or multi-row photodiode array, of a CCD (charge coupled device) or of a PSD (position sensitive device).

24. An apparatus in accordance with claim 20, characterized in that all transmission units and reception units (S, S1, S2, E, E1, E2) are arranged in a common sensor housing (23).

25. An apparatus in accordance with claim 20, characterized in that it is used to carry out the method in accordance with a preceding claim.

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